WHAT IS CLAIMED IS:

1. An optical pickup device comprising:

a first light source that emits first light;

a second light source that emits second light with a wavelength different from a wavelength of the first light; and

a step-like diffraction element that deflects one of the first light and the second light to match optical axes of the first light and the second light, the step-like diffraction element defining a light incident face and a light emitting face, one of the incident face and the emitting face having multiple sets of step-like grating faces,

wherein a step difference between adjacent ones of each one of the multiple sets of the step-like grating faces has a measurement that generates a phase difference corresponding to one wavelength of one of the first light and the second light, and

the number of steps of each of the multiple sets of step-like grating faces is set at a value that maximizes one of a (+) first order diffraction efficiency and a (–) first order diffraction efficiency for the other of the first light and the second light.

2. An optical pickup device according to claim 1, wherein the step-like diffraction element straightly advances one of the first light and the second light, and deflects the other of the first light and the second light to thereby match the optical axes of the first light and the second light.

3. An optical pickup device according to claim 2, wherein the step-like grating faces of the step-like diffraction element are formed in concentric circular curves when viewed from the emitting face of the step-like diffraction element.

4. An optical pickup device comprising:

a first light source that emits first light;

a second light source that emits second light having a wavelength different from a wavelength of the first light; and

a step-like diffraction element that deflects one of the first light and the second light to match optical axes of the first light and the second light,

the step-like diffraction element defining a light incident face and a light emitting face, one of the light incident face and the light emitting face having multiple sets of step-like grating faces,

wherein, when a wavelength λ 1 of the first light is longer than a wavelength λ 2 of the second light, a step difference between adjacent ones of the step-like grating faces has a measurement that generates a phase difference corresponding to one wavelength for the first light, and

the number of steps of each of the multiple sets of step-like grating faces is set at an integer that is closest to a value α that satisfies an expression of $\lambda 2/\lambda 1 = \alpha/(\alpha + 1)$.

5. An optical pickup device according to claim 4, wherein, when the wavelength λ 1 of the first light is about 785nm, and the wavelength λ 2 of the second light is about 650nm, the number of steps of each of the multiple sets of step-like grating faces is five.

6. An optical pickup device according to claim 4, wherein, when the wavelength λ 1 of the first light is about 635nm, and the wavelength λ 2 of the second light is about 470nm, the number of steps of each of the multiple sets of step-like grating faces is three.

7. An optical pickup device comprising:

a first light source that emits first light;

a second light source that emits second light having a wavelength different from a wavelength of the first light; and

a step-like diffraction element that deflects one of the first light and the second light to match optical axes of the first light and the second light,

the step-like diffraction element defining a light incident face and a light emitting face, one of the light incident face and the light emitting face having multiple sets of step-like grating faces,

wherein, when a wavelength λ 1 of the first light is longer than a wavelength λ 2 of the second light, a step difference between adjacent ones of the step-like grating faces of each of the multiple sets of step-like grating faces has a measurement that generates a phase difference corresponding to one wavelength for the second light, and

the number of steps of each of the multiple sets of step-like grating faces is set at a value in which one is added to an integer that is closest to a value α that satisfies an expression of $\lambda 2/\lambda 1 = \alpha/(\alpha + 1)$.

8. An optical pickup device according to claim 7, wherein, when the wavelength λ 1 of the first light is about 785nm, and the wavelength λ 2 of the second light is about 635nm, the number of steps of each of the multiple sets of step-like grating faces is five.

9. An optical pickup device according to claim 7, wherein, when the wavelength λ 1 of the first light is about 635nm, and the wavelength λ 2 of the second light is about 470nm, the number of steps of each of the multiple sets of step-like grating faces is four.

10. A method for designing an optical pickup device comprising a first light source that emits first light, a second light source that emits second light having a wavelength different from a wavelength of the first light, and a step-like diffraction element that deflects one of the first light and the second light to match optical axes of the first light and the second light, the step-like diffraction element defining a light incident face and a light emitting face, one of the light incident face and the light emitting face having multiple sets of step-like grating faces, the method comprising the steps of:

when a wavelength λ 1 of the first light is longer than a wavelength λ 2 of the second light, setting a step difference between adjacent ones of the step-like grating faces to have a measurement that generates a phase difference corresponding to one wavelength for the first light; and

setting the number of steps of each of the multiple sets of step-like grating faces to be at an integer that is closest to a value α that satisfies an expression of $\lambda 2/\lambda 1 = \alpha /(\alpha + 1)$.

11. A method for designing an optical pickup device comprising a first light source that emits first light, a second light source that emits second light having a wavelength different from a wavelength of the first light, and a step-like diffraction element that deflects one of the first light and the second light to match optical axes of the first light and the second light, the step-like diffraction element defining a light incident face and a light emitting face, one of the light incident face and the light emitting face having multiple sets of step-like grating faces, the method comprising the steps of:

when a wavelength λ 1 of the first light is longer than a wavelength λ 2 of the second light, setting a step difference between adjacent ones of the step-like grating faces of each of the multiple sets of step-like grating faces to have a measurement that generates a phase difference corresponding to one wavelength for the second light; and

setting the number of steps of each of the multiple sets of step-like grating faces to be at a value in which one is added to an integer that is closest to a value α that satisfies an expression of $\lambda 2/\lambda 1 = \alpha /(\alpha + 1)$.